Evaluation of lameness: which part is affected?

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Lameness examination: which part is involved?

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Introduction

Many cases of bovine lameness are easy to diagnose (but not necessarily easy to treat!). However, clinical signs in some cattle are not characteristic and diagnosis is difficult. A systematic approach to the clinical examination of lame cattle is crucial for a definitive diagnosis. This presentation incorporates videos of common types of lameness in cattle as part of the discussion of the most important techniques of a lameness examination.

1. It is generally easy to localise the lameness

- As a rule, lame cattle are only presented for veterinary examination after treatment attempts by the owners have failed or spontaneous resolution has not occurred; in such cases, the affected limb has already been identified.
- The goal of a lameness examination is to localise the site of lameness and to elucidate the aetiology whenever possible. Swelling, muscle atrophy, signs of compensatory stress in other parts of the locomotor system, fistulous tracts and other types of lesions may provide clues as to the cause of the lameness.
- When a cause has been identified, it is important that the lameness examination not end here. There may be multiple causes at play. A good example is a claw lesion that is associated with septic arthritis further proximally, such as stifle joint arthritis.

2. It is usually easy to differentiate septic and aseptic processes (because most are septic!)

- A general physical examination of the patient is always indicated and aids in the differentiation of septic and aseptic processes.
- Increased respiratory and heart rates and fever usually indicate an infectious process.
- Increased respiratory and heart rates without fever are usually indicative of pain and not an infectious process.
- Haematogenous spread of bacteria and secondary infection (for instance endocarditis) is not uncommon in patients with chronic claw infections.
- A positive glutaraldehyde test provides information on the chronicity of the lesion and possible involvement of other organ systems.

History

Information supplied by the owner regarding the duration of the lameness is often unreliable. Antibiotics, sedatives and analgesics can mitigate lameness and lead to underestimation of the severity of the disease. A good history often helps establish the cause of lameness, for example, poor injection technique may be the cause of iatrogenic nerve damage.

Observation of the resting patient

Initial observation: A poor body condition score may indicate a lameness of long duration. Ideally the patient is observed while lying down, during rising and when standing. Animals that remain kneeling may suffer from uni- or bilateral fracture of P3 or rupture of the suspensory ligament. Crossing of the forelimbs is indicative of fracture of P3 or a painful condition of the sole (pus in the sole) of the medial claws. Many nerve lesions and spastic paresis are associated with characteristic postures.
Subsequent observation: Localised muscle atrophy or swelling, for example a bursa, asymmetry typically seen with hip luxation, or the pattern axial deviation combined with a slight weight bearing that is seen with a metacarpal growth plate fracture should be noted during the examination. The degree of muscle atrophy may indicate the duration as well as location of the lameness.

Observation of the moving patient
Ideally the patient is led by an assistant using a halter and lead rope. Leading in circles, on hard surface compared to soft surface can provide useful and sometimes pathognomonic information (for example in laminitis cases).

Type of lameness
Observing how the foot contacts the ground or the pattern of weight bearing helps with the lameness diagnosis. A *supporting leg lameness* is indicative of a disease process distal to the carpus/tarsus, whereas a *swinging leg lameness* is indicative of a painful process proximal to the carpus/tarsus. A supporting leg lameness may appear more severe on hard ground and less severe on soft ground. Infectious processes, particularly those involving joints (also above carpus and tarsus), usually result in supporting leg lameness because of severe pain.

Degree of lameness
- Regardless of the type of scoring system used, it is important to accurately determine the severity of lameness (assessment of severity of lameness based on observation of an arched-back posture is not specific enough).
- Trying to determine whether a cow is lame or not is probably the most difficult task. When sheep were graded using a 7-point-scoring system (0, not lame; 7, severely lame), determining whether sheep should be allotted a score of 0 or 1 proved to be the most difficult.
- In another study with 5 lameness grades, cows with a sole ulcer had a mean grade of 4, and cows without a sole ulcer a mean grade of 3.1 out of 5 [1].
- Cows may 'hide' lameness in order to maintain their social herd status (ranking order, feed bunk access)
- There is usually good agreement between the severity of lameness and the severity of the underlying disease.
- When both forelimbs and/or both hind limbs are affected, the degree of lameness appears milder than expected because the patient tries to alleviate weight bearing on all limbs.
- Cattle with laminitis have a short stride and appear to 'walk on eggshells'.

Palpation 3. „<u>Always</u>! start distally".
Since 90 % of lameness causes are located in the digits, it should be a professional habit to start distally. Examination of the claws can only be accomplished with the foot lifted off the ground. The use of a foot trimming chute or tilt table facilitates this part of the examination [2,3].

- The claws including the interdigital space are cleaned and all faecal matter is removed.
- The skin over swollen or painful areas is clipped.
- The first two steps aid in the diagnosis and are crucial for successful treatment.
- A response to a painful stimulus can be differentiated from a defensive movement by repeated examinations.
- The claws are examined using **hoof testers**. Hoof testers simulate a more forceful localised type of palpation and are used to elicit a pain response, which helps to locate the region affected within the hoof capsule.
- The digits including the claws are also subjected to manual *flexion, extension and rotation*.

Probing a lesion
Probing a wound is a modified type of palpation. The depth of a fistula can be assessed and one can determine whether it extends to bony or soft tissue. Care must be taken to prevent creation of a new defect or enlargement of an existing one during probing. A superficial defect (skin lesion, inflammation of corium) can be easily differentiated from a deep lesion (sole ulcer, sequester). A fresh wound should not be probed unless it is known to be aseptic, to avoid contamination of deeper areas.

Testing for lameness proximal to the digits:
The 'gonitis test' is used to localise pain in the stifle area, especially septic arthritis of the stifle joint. If the hind limb can be pulled backward with little resistance, the gonitis test is positive.
Rupture of the fibularis (peroneus) tertius muscle is diagnosed when the stifle joint can be flexed and the hock extended at the same time. The gastrocnemius tendon appears dimpled when the hock is extended. In patients with this condition, the 'reciprocal apparatus' is disabled.
Testing of skin sensitivity in cattle with paralysis; auscultation to detect crepitation in cattle with fractures or luxations, particularly in the humerus and hip area; rectal examination to diagnose pelvic fractures in downer cattle are further useful techniques.

Diagnostic nerve blocks
To block a single claw, the interdigital space is infiltrated with lidocaine at the level of the first phalanx, followed by anaesthesia of the palmar/plantar digital nerve medially or laterally (depending on which claw is to be examined) at the level of the fetlock joint. A ‚ring block' involves the palmar/plantar digital nerves and the dorsal nerves (radial and fibular nerves in the fore- and hind limbs, respectively) at the level of the proximal epiphysis of the cannon bone [4].

Radiography and ultrasonography
Radiographic and ultrasonographic examination are essential to specialised facilities and allow further precision in diagnosis, prognosis, and treatment. Computer tomography or MRI can be helpful especially in neurologic cases and in diseases of the head [5,6], but also in the limbs [7,8].

Centesis
Centesis serves to differentiate various fluid accumulations (abscess, seroma, haematoma) or to determine whether an enlarged joint is septic or not. The location of each portal should be evaluated, with the help of textbooks if necessary. Strict adherence to aseptic principles is mandatory to avoid iatrogenic infection. Centesis should not be done through areas of septic cellulitis because of the risk of introducing micro-organisms into deeper tissues. Disease cannot be ruled out when centesis fails to yield an aspirate; fluid accumulations may be missed or may be too viscous or contain too much fibrin to facilitate collection.

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